



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JULY 2010 SESSION

SUBJECT CODE : FAD 10002
SUBJECT TITLE : INTRODUCTION TO AUTOMATION
LEVEL : DIPLOMA
TIME/DURATION : 12.30 pm – 2.30 pm
(2 HOURS)
DATE : 14 NOVEMBER 2010

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper **CAREFULLY**.
2. This question paper is printed on both sides of the paper.
3. Please write your answers on the answer booklet provided.
4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
5. This question paper consists of **TWO (2)** sections. Section A and B. Answer all questions in Section A. For Section B, answer two (2) questions only.
6. Answer all questions in English.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer only ALL questions.**

Please use the answer booklet provided.

Question 1

(a) Define 'Automation'.

(2 marks)

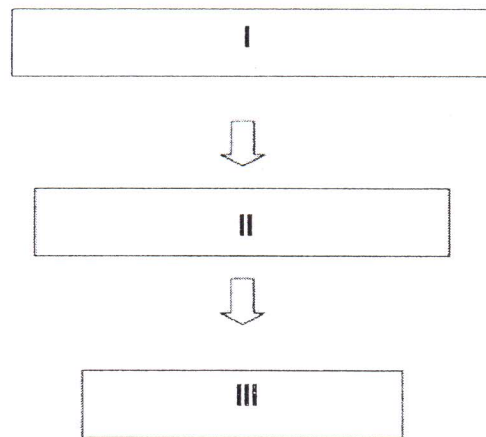
(b) **Figure 1** shows on 'How automation arises'.

i. Fill in the boxes (I, II, and III)

(3 marks)

ii. Explain the definition for each box labeled I, II and III

(6 marks)

**Figure 1: How automation arise**(c) Give **two (2)** examples of automation for each environment.

i. Commercial environment

ii. Service industries

(4 marks)

Question 2

There are five (5) components in the closed loop feedback controls. State only **three (3)** of the components.

(3 marks)

Question 3

(a) Illustrate the different between a digital signal and an analog signal. Provide an example of where to use each type of signal.

(6 marks)

(b) List **five (5)** types of sensor's detection in automated system.

(5 marks)

(c) True or False

- i) Light sensors consist of a transmitter and a receiver
- ii) Bimetallic strip use to monitor the electric heater
- iii) A thermocouple is made by twisting two types of metals together at one end
- iv) Inductive sensor can detect metal only
- v) Capacitive sensor can detect non metal only
- vi) Temperature sensor give the analog output to the processor
- vii) RTDs means Resistance Temperature Detectors
- viii) Reflex nozzle sensor is the pneumatic sensor
- ix) There is no physical contact in contact sensor's type

(9 marks)

Question 4

- (a) Complete the truth table in Table 1 below for each type of logic function

Table 1: Table of logic function

a	b	$W = a . b$	$X = a + b$	$Y = X . Y$	$Z \neq Y$
0	0				
0	1				
1	0				
1	1				
		AND function	OR function	AND function	NOT function

(10 marks)

- (b) Programmable Logic Controller (PLC) incorporated with **four (4)** units. Name all of them and give the definition for each unit.

(8 marks)

- (c) Non return valve is used to stop the flow in one direction and permit flow in opposite direction. Name **two (2)** types of non return valve in pneumatic control and draw the symbol for each of them.

(4 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer only TWO (2) questions.

Please use the answer booklet provided.

Question 5

Consider a control circuit shown in Figure 2.

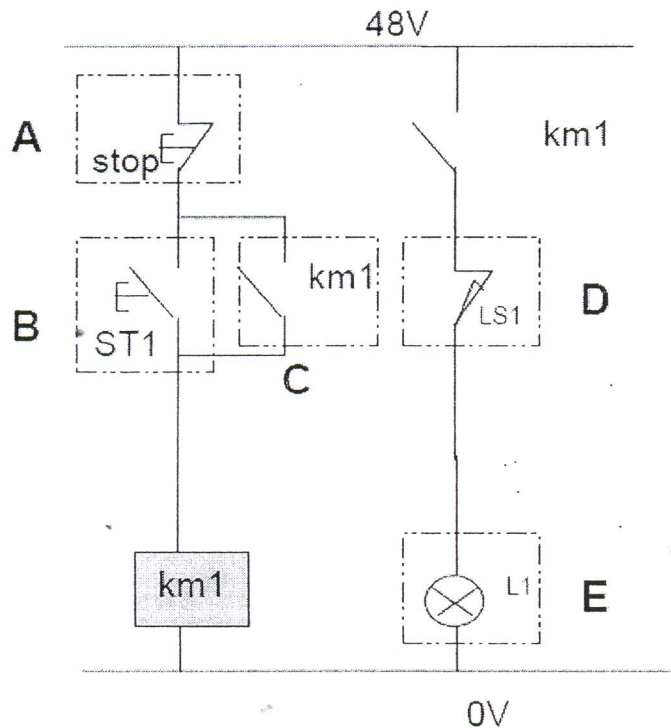


Figure 2: Schematic diagram of a simple control circuit

- a) Name the components A, B, C, D and E (5 marks)
 - b) Explain in detail the functionality of this control circuit (5 marks)
 - c) Modify the control circuit in Figure 3 by adding a yellow indicator light and another start button (ST2). The yellow indicator light shows that the power supply is ON and when one of the two start button is pressed (ST1 or ST2), the yellow light will OFF. (10 marks)
- Note: Students are allowed to use as many as contactors and relays*

Question 6

(a) Answer all questions depending on the **Figure 3** below

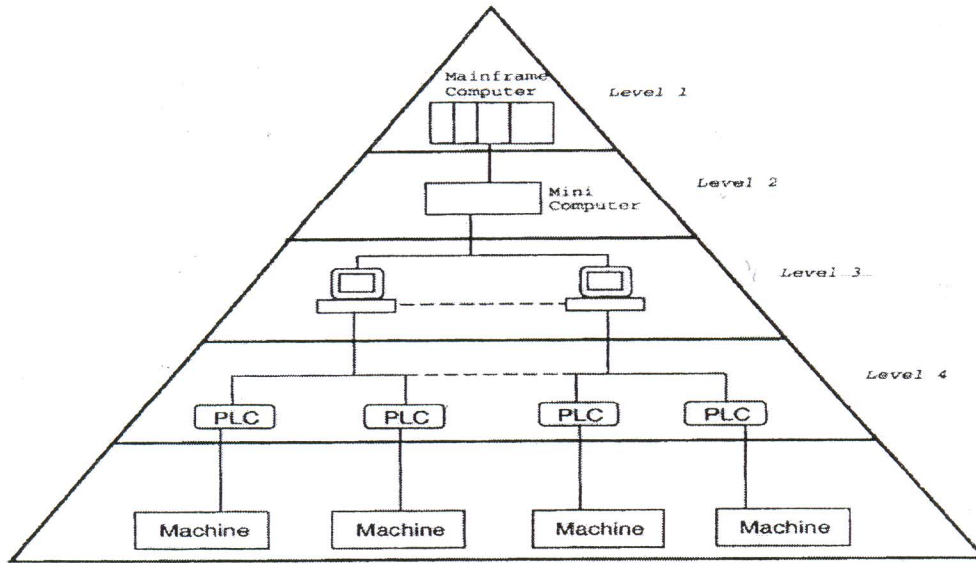


Figure 3: Hierarchy in an Automated Factory

- i. Name each level of the pyramid system above. (4 marks)
- ii. Explain briefly the definition of management level, sales & marketing level and production level in CIM systems. (6 marks)

(b) Shown in **Figure 4** below is an automated conveyor system. The conveyor will stop if the package touches LS1.

- i. Define all input and output devices in the system. (6 marks)
- ii. Choose the suitable sensor for the application and give the reason why you chose it. (4 marks)

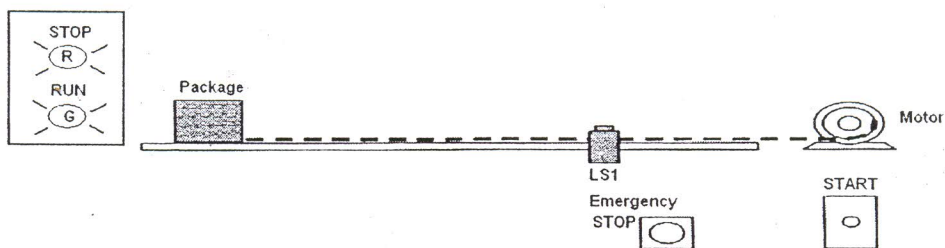


Figure 4: Conveyor system

SECTION B (Total: 40 marks)

INSTRUCTION: Answer only TWO (2) questions.

Please use the answer booklet provided.

Question 5

Consider a control circuit shown in Figure 2.

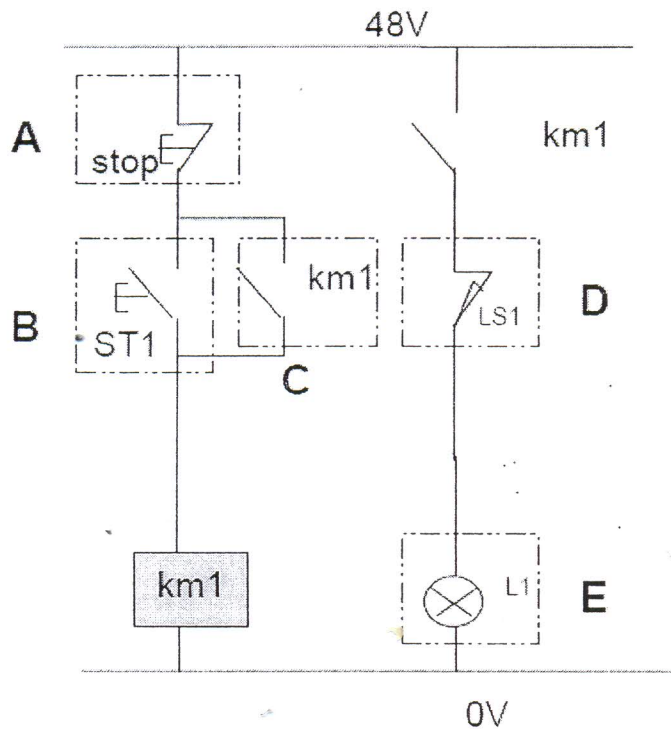


Figure 2: Schematic diagram of a simple control circuit

- a) Name the components A, B, C, D and E
(5 marks)
- b) Explain in detail the functionality of this control circuit
(5 marks)
- c) Modify the control circuit in Figure 3 by adding a yellow indicator light and another start button (ST2). The yellow indicator light shows that the power supply is ON and when one of the two start button is pressed (ST1 or ST2), the yellow light will OFF.
Note: Students are allowed to use as many as contactors and relays
(10 marks)

Question 6

(a) Answer all questions depending on the **Figure 3** below

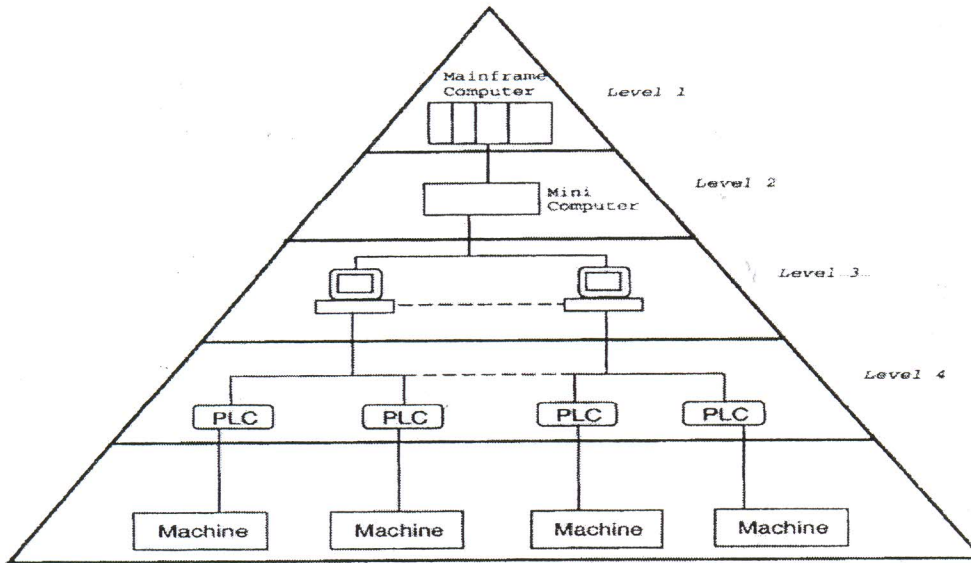


Figure 3: Hierarchy in an Automated Factory

- i. Name each level of the pyramid system above. (4 marks)
- ii. Explain briefly the definition of management level, sales & marketing level and production level in CIM systems. (6 marks)

(b) Shown in **Figure 4** below is an automated conveyor system. The conveyor will stop if the package touches LS1.

- i. Define all input and output devices in the system. (6 marks)
- ii. Choose the suitable sensor for the application and give the reason why you chose it. (4 marks)

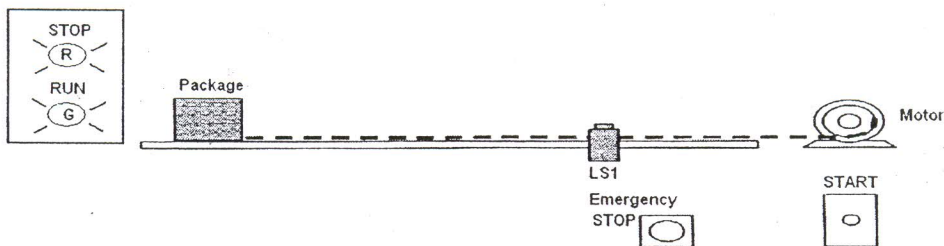


Figure 4: Conveyor system

Question 7

- (a) Element A takes the temperature signal and transforms it to resistance signal, element B transform the resistance signals into current signal, and element C transform the current signal into a display movement of a pointer across a scale. What is element A, B, and C? Illustrate your answer using a block diagram.

(6 marks)

- (b) During winter season (in Europe), the temperature can drop until 0° celcius. A hotel management has installed one automated system that can work automatically in order to maintain the temperature in hotel rooms to be at 27° celcius constantly.
- i. Select a suitable sensor, processor and actuator that can be used in the system. Explain the reason you chose them.

Note: You should choose the best actuator for this system

(6 marks)

- ii. With the aid of a block diagram, explain briefly how the system works.

(8 marks)

END OF QUESTION